



**ELECTRIC POWER RESEARCH INSTITUTE, INC.**

**INNOVATIVE LOW GHG RESIDENTIAL SPACE CONDITIONING TECHNOLOGIES**

PRINCIPAL INVESTIGATOR: Sara Beaini, Engineer/Scientist III  
Electric Power Research Institute

<b>INNOVATION CENTER RESEARCH GRANT</b>	<b>RESEARCH INNOVATION FIELD</b>
<b>\$ 4,724,342.28</b>	<input type="checkbox"/> Carbon Dioxide Removal
<b>Duration: 36 Months</b>	<input type="checkbox"/> Methane Reduction
	<input checked="" type="checkbox"/> Heating Cooling, and Thermal Storage

This proposal aims to advance innovative space cooling technologies to benefit low-income and disadvantaged communities in California, by working to demonstrate and commercialize cooling technologies as well as by evaluating user behavior to better understand needs and technology use in homes. To accelerate adoption of these energy-saving household technologies, the project will also establish innovative payment and financing solutions.

<b>PARTNERS:</b>	<ul style="list-style-type: none"> <li>➤ <b>Treau</b></li> <li>➤ <b>WattzOn</b></li> <li>➤ <b>Central Valley Opportunity Center</b></li> <li>➤ <b>City of Modesto</b></li> </ul>
<b>RESEARCH ACTIVITIES</b>	<ul style="list-style-type: none"> <li>➤ This proposal will advance Treau's easy-install mini-split heat pump/air conditioner (AC) system, with low-GWP refrigerant, to a full system demonstration. The project will also establish innovative payment and financing solutions for low income and disadvantaged households through the partnership with WattzOn, who will also evaluate user behavior. Additional technological areas of research include building EPRI's low-cost residential space conditioning system with thermal energy storage using a low GWP refrigerant, replacing single phase secondary fluids with two phase working fluid for more efficient heat exchangers with natural refrigerants, and developing and testing Treau's oil-free membrane compressor for low-GWP heat pumps and ACs.</li> </ul>
<b>FACILITATES GREENHOUSE GAS EMISSIONS REDUCTIONS:</b>	<ul style="list-style-type: none"> <li>➤ These technologies have the ability to increase the efficiency of HVAC and refrigeration systems an estimated 50%, as well as the ability to increase reliability and lower emissions due to escaped refrigerants. Furthermore, this technology should increase the penetration of heat pumps, which can lower space heating and water heating energy use by 50%, reducing overall household energy consumption. In total, replacing all heating with heat pumps and increasing all cooling efficiency by 50% would lead to a reduction of about 5 quadrillion BTU/year of energy use in the United States.</li> </ul>
<b>BENEFITS DISADVANTAGED AND LOW INCOME COMMUNITIES:</b>	<ul style="list-style-type: none"> <li>➤ This proposal aims to support SGC's mission to engage and support local communities by increasing equitable access to energy services and building systems that benefit low-income and underrepresented communities, and in particular will provide low-cost and highly efficient HVAC equipment for deployment in City of Modesto. The collaborators aim to reverse the typical product innovation and design paradigm by providing a blueprint for innovators that enable design for low-income and underrepresented communities first, not as an add-on. Activities include analysis of market requirements, product fit, and financing alternatives.</li> </ul>
<b>ENGAGEMENT ACTIVITIES</b>	<ul style="list-style-type: none"> <li>➤ The projects will engage with the city of Modesto, Central Valley Opportunity Center, a local non-profit focused on advancing employment, skills and education for underserved residents, including a full-time Community Liaison. This collaboration will give quantitative results on the user voice, customer journey and product fit through means such as focus groups, forums, interim results presentations, internships, surveys and user data. In order to achieve this, engagement will happen throughout the study period, to better understand user perspectives and needs.</li> </ul>